

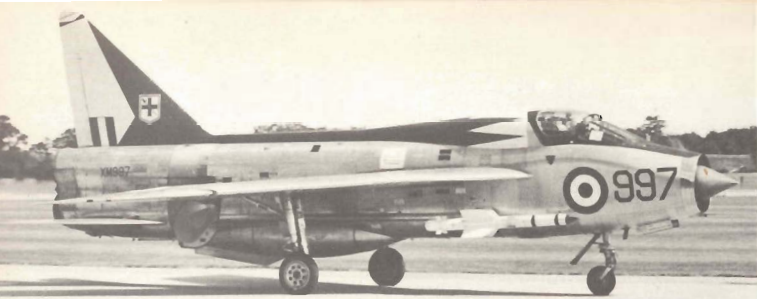
AIRCAM AVIATION SERIES

№37

ENGLISH ELECTRIC (BAC) LIGHTNING

IN ROYAL AIR FORCE & FOREIGN SERVICE





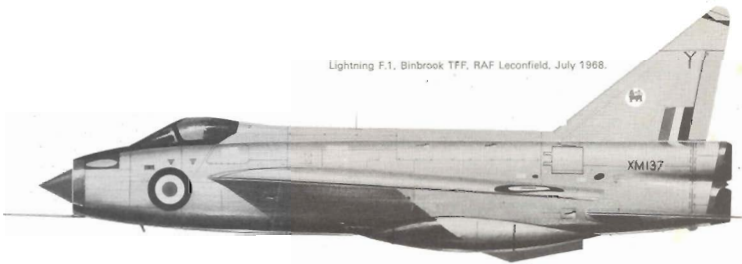
Above: Lightning T.4 in the scarlet and white markings of No. 226 Operational Conversion Unit.



Above: Lightning F.1A in the markings of No. 145 Squadron/No. 226 OCU, Bentwaters, May 1966 and below a T.4 of the same unit, note last three of the serials repeated in large numerals on the fin. (Photo Roger Levy)



Lightning F.1, Binbrook TFF, RAF Leconfield, July 1968.



ENGLISH ELECTRIC (BAC) LIGHTNING

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Gothscans Ltd

ACKNOWLEDGEMENTS

Continuous development over a decade has made the Lightning of the seventies one of the most lethally effective interceptors and ground-attack aircraft in the world, certainly many an air force would have done better with the Lightning than the equipment they currently operate. On most of the colour side-view illustrations the refuelling probe has been left off where applicable so as not to obscure the nose markings. Thanks are due to all those who assisted with photographs and information whose names are listed below in alphabetical order.

R. C. B. Ashworth, Paul Bennett, British Aircraft Corporation, Flight International, A. P. de Jong, Roger Levy, Peter R. March, Stephen P. Peltz, Brian Pickering, RAF/MoD, J. W. R. Taylor, D. M. Verheyleweghen.

Lightning F.6, No. 11 Squadron, RAF, September 1971.
Note 469 on fuselage in square style black letters.



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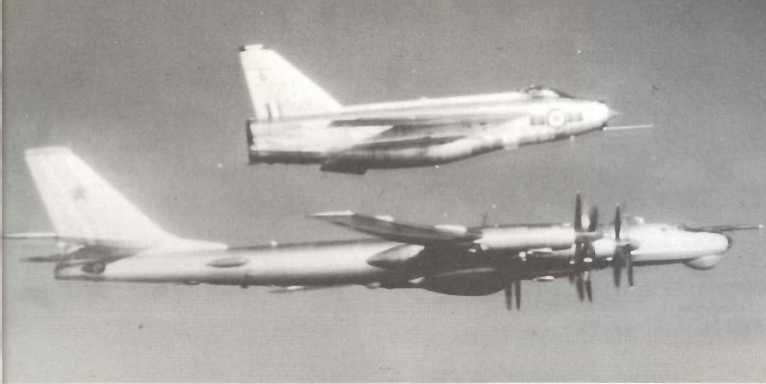
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Line-up of F.1A's of No. 74 Squadron clearly showing stencil detail on nose. (BAC via A. P. de Jong)





Lightning F.6, XS 938 of No. 23 Squadron escorting a Russian Bear off the premises. (RAF/Mod via A. P. de Jong)

ENGLISH ELECTRIC (BAC) LIGHTNING

More than 20 years since its conception, and over a decade since its service introduction, the English Electric (BAC) Lightning is still one of the world's finest interceptor aircraft and is likely to remain the mainstay of Britain's fighter defences for at least a further four or five years and possibly even longer, as well as serving with the air forces of Saudi Arabia and Kuwait.

Not only does the Lightning have an outstanding rate of climb (initially about 50,000 ft./min.), a maximum speed of the order of Mach 2.27 (1,500 m.p.h.), and a service ceiling well in excess of 60,000 feet, but it combines this performance with highly responsive yet docile handling characteristics throughout its flight envelope, making it both an enjoyable aircraft to fly and a stable and effective weapons system.

The Lightning owes its genesis to Experimental Requirement 103 issued by the Ministry of Supply in 1947 for a limited supersonic research aircraft, designs for which were submitted by Fairey for their FD.2, and by English Electric with their P.1. Two FD.2's were built purely as research aircraft, whereas the P.1, originally designed by W. E. W. Petter of Canberra fame, but developed by his successor, F. W. Page, had operational applications, and in modified form became the basis of Specification F23/49 issued on 3 September 1949.

On 1 April the following year English Electric were awarded a contract for three P.1A test aircraft, two of which, WG 760 and WG 763, were to be flying prototypes powered by a pair of Armstrong Siddeley Sapphires of 8,300 lb. thrust each, staggered one above the other, while the third airframe, WG 765, was structurally tested to destruction. Three further, more advanced, development aircraft were also ordered as P.1B's.

WG 760, the first prototype, made its maiden flight from Boscombe Down on 4 August 1954, during which it attained Mach 0.85 in the hands of Wg./Cdr. Roland Beamont, English Electric's chief test pilot. Only a week later it became the first British aircraft to exceed Mach 1.0 in level flight. While WG 760 was used for handling and performance tests the second aircraft, which flew on 18 July 1955, was employed for structural and armament trials, being equipped with two 30 mm. Aden cannon and a 250 gallon ventral fuel tank. This aircraft was later fitted with Ferranti Airpass radar in a cone situated in the nose air intake, while WG 760 tested leading edge

flaps, subsequently replaced by a cambered extension to the wing tips, which reduced subsonic drag and improved low speed handling.

In November 1956 the P.1 was ordered in quantity for the RAF and on 4 April 1957 the first P.1B, XA 847, again flown by "Roly" Beamont, made its initial flight from Warton, easily reaching Mach 1.2 in the process. The P.1B's were powered by two Rolls-Royce Avon 200 series engines offering over 14,000 lb. thrust each with reheat. Compared with the Mach 1.53 of the P.1A's, the Avons conferred the P.1B's with a Mach 2.0 performance, first achieved on 25 November when XA 847 became the first British aircraft to exceed this speed in level flight. It was at one time planned to boost rate of climb and altitude by fitting a Napier Double Scorpion rocket motor in place of the ventral tank; although tested on XA 847 the project was later cancelled.

The P.1B's (XA 847, 853, and 856) featured a circular air intake with a central shock cone within which the Airpass radar was to be housed, redesigned fuselage with a new cockpit affording better visibility, and a dorsal spine. After much deliberation the name for the production version of the P.1B was announced on 23 October 1958 as the "Lightning", although "Excalibur" had at one time been highly favoured.

Twenty pre-production aircraft had earlier been ordered to speed up the development and service entry of the type, and the first of these, XG 307, flew on 3 April 1958. Externally these machines, serialised XG 307-313, and XG 325-337, were similar to the P.1B's, but progressively carried more operational equipment and were used for a variety of trials embracing powerplants, handling, radar, electronics, autopilot, guns, and guided weapons. As well as a pair of 30 mm. Aden Mk. 4 cannon in the upper nose, the Lightning was intended to carry a de Havilland Firestreak infra-red homing guided missile mounted on a pylon from each side of the lower front fuselage. It was found necessary to compensate for these by increasing the fin area by 30%, first introduced in XG 310. The Firestreaks could be replaced by a weapons pack which contained two additional Aden guns, or 48 2 in. unguided air-to-air rockets.

On 29 October 1959 XM 134, the first production Lightning F.1, made its initial flight from Warton, and in December of the same year three of the late pre-



WG760 the prototype Lightning, a vastly different aircraft both in appearance and performance to the F.6 of today. (BAC)

production aircraft, XG 334-336 were issued to the RAF's Air Fighting Development Squadron (AFDS) at Coltishall, Norfolk, as "A", "B", "C".

On 5 March 1960 one of these three initial aircraft, XG 334 "A", suffered a hydraulic failure while flying off the Norfolk coast and crash-landed off the shore near Wells-next-the-Sea. This inauspicious start to the Lightning's service career was offset at the end of May when the AFDS Lightnings, flying from Leconfield in Yorkshire, took part in an air defence exercise during which they attained a very satisfactory interception rate. By this time six aircraft were on unit strength, the pre-production machines being supplemented by four full production F.1's, the first of which, XM 135 "D", having been delivered on 14 May.

74 Squadron, also based at Coltishall, became the first RAF operational fighter squadron to be equipped when XM 165, the first of its 12 F.1's, was taken on strength on 29 June 1960. Conversion from the squadron's Hunter 6's presented a formidable task but with the help of the Central Fighter Establishment's Lightning Conversion Unit it was achieved with so few problems that 74 Squadron was able to put up a formation of four Lightnings during the Farnborough Air Show the following September, led by the C.O., Sqn./Ldr. J. F. G. Howe.

By the following year, under its new C.O., Sqn./Ldr. P. G. Botterill, 74 Squadron's aerobatic team was expanded, and in 1962, known as "The Tigers", it became the RAF Fighter Command's official aerobatic team, for which its Lightnings acquired black spines and fins which bore a large tiger's head marking.

In 1961 it had been proposed to sell 12 Lightning F.1's to India, and for a time 74 Squadron had expected to "donate" most, if not all, of their fleet and replace them with F.1A's. However, the deal fell through and 74 continued to fly plain Mark 1's until July 1963.

Seven of its Lightning F.1's were then handed over to 226 OCU at Middleton St. George, while 74 acquired former AFDS aircraft to offset this deficiency. In February 1964 the squadron moved to Leuchars in Scotland, and re-equipped with brand new Lightning F.3's two months later, thereby releasing its former F.1's for use with 226 OCU and with 111 Squadron to supplement that unit's dwindling number of F.1A's.

In June 1965 the Lightning F.1 was withdrawn from service and most went to 33 M.U. at Lyneham where some were scrapped and the remainder overhauled and up-dated for service in a new role as target facilities aircraft. The first Lightning Target Facilities Flight was formed at Binbrook early in 1966, soon followed by similar units at Leuchars and Binbrook. These flights are equipped with two or three Lightnings and have the task of providing supersonic simulated targets for the front-line Lightning squadrons which share the same base. Of the 19 Lightning F.1's completed only seven

remain in service at the time of writing.

The next mark produced was the F.1A, which had a few internal changes, notably the provision for in-flight refuelling with a detachable probe mounted beneath the port wing, and UHF radio (although F.1's were later fitted with UHF), while externally it had a cable duct running along each side of the fuselage. Twenty-eight F.1A's were completed, the first of which XM 169, made its maiden flight on 16 August 1960.

56 Squadron at Wattisham, Suffolk, received its first Lightning F.1A, XM 172, on 14 December 1960 and by the following spring 111 Squadron at the same base had also begun to re-equip. 56 Squadron pioneered the use by Lightning squadrons of air-to-air refuelling and in July 1962 some of the unit's aircraft flew non-stop from Wattisham to Akrotiri, Cyprus, with the aid of Valiant tankers.

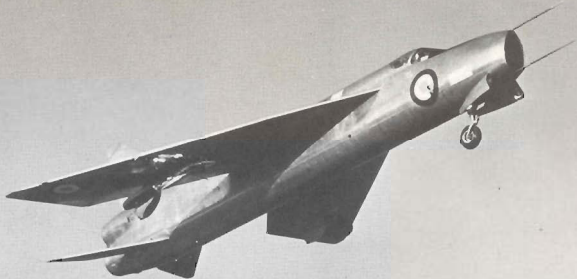
The following years 56 Squadron took over as Fighter Command's premier aerobatic team; known at the "Firebirds", and with their aircraft specially adorned with distinctive red markings, they put on some dramatic displays which made maximum use of their aircraft's phenomenal rate of climb, high rate of turn, and rapid response. Meanwhile 56's rivals were also very active, undergoing detachments to Germany, Cyprus, Malta, and to El Adem in Libya, where they practised air-to-air firing fitted with 48 2 in. rockets in place of Firestreaks and air-to-ground gunnery with two extra Aden guns displacing the Firestreaks. "Treble One" also took part in flight-refuelling compatibility trials taking on fuel from Fleet Air Arm Sea Vixen tankers.

When 56 and 111 Squadrons relinquished their F.1A's in favour of a later mark of Lightning early in 1965 their early aircraft were transferred to 226 OCU at Coltishall where almost a dozen still serve in the advanced training role. A few F.1A's are also used by the Target Facilities Flights where they supplement the surviving F.1's.

Third version of the Lightning to make its service entry was the dual-controlled Lightning T.4, intended as a conversion and continuation trainer but retaining full operational capability by virtue of its twin Firestreaks. The Aden cannon were deleted owing to the extensively re-designed front fuselage which was widened to accommodate two crew members sitting side by side; in other respects the T.4 equated to the F.1A.

The first of two prototype T.4's, XL 628, flew on 6 May 1959, with the first of 20 production aircraft, XM 966, following on 15 July the next year. Two aircraft, XM 966 and 967, were later converted to T.5's, while two more, XM 989 and 992, were sold to Saudi Arabia as T.54's in 1966.

The Lightning Conversion Squadron (LCS) became the first main user of the T.4 on 29 June 1962 with the delivery to Middleton St. George of XM 970. The LCS had an initial strength of ten T.4's which were used to



WG 760 just airborne on an early test flight. First flight was from Boscombe Down on 4 August 1954 with W/Cdr. Roland Beaumont at the controls. (BAC)

convert pilots to the Lightning, aided by flight simulators which had for some time previously been installed at the base. In June 1963 the LCS became No. 226 Operational Conversion Unit, at the same time taking over the shadow squadron number and markings of No. 145 Squadron, being classified as a reserve interceptor unit in times of emergency. This aspect of the OCU is still taken very seriously and its flying instructors regularly participate in operational exercises to maintain their combat proficiency. On 13 April 1964 No. 226 OCU vacated Middleton St. George (now Teesside Airport) and moved to its current base of Coltishall where it still operates several T.4's with its basic squadron, which became 65 Squadron in May 1971.

In addition to the OCU a single Lightning T.4 was allocated to each of Nos. 19, 23, 56, 74, 92, and 111 Squadrons, although only 19 and 92 still fly them.

The Lightning F.2 became the next variant to enter RAF service, which it did in November 1962 when XN 771 was delivered to the AFDS at Binbrook (to which base the unit had moved earlier in the year) on the fourteenth of that month; the very first F.2, XN 723, flying for the first time on 11th July 1961. The F.2 was essentially a refinement of the F.1A, featuring fully variable reheat for its Avon 210 engines (in place of four-stage reheat on earlier versions), automatic flight control, improved avionics, a liquid oxygen system, and a stand-by turbo-generator for d.c. electric supply, for which the small dorsal spine air intake provided the only visible means of identification between the F.2 and F.1A.

The AFDS initially received four Lightning F.2's, XN 726/K, 729/L, 771/M, and 777/N, but the last of these aircraft had a very short career with the squadron because it overshot the runway at Binbrook on 21 December 1962 with the C.O. at the controls and ended up in the safeland crash barrier, having sustained enough damage to necessitate major repairs by the manufacturers. This particular aircraft only returned to squadron service seven years later, by which time it had been converted to a Mark 2A. XN 772 replaced it with the AFDS,

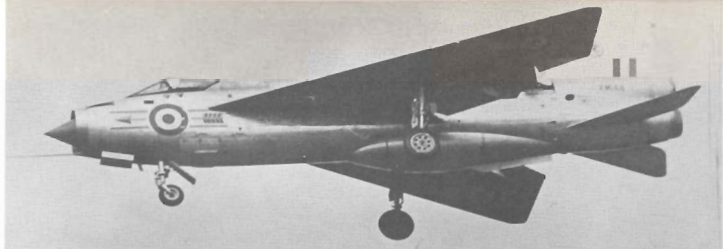
which continued to operate Lightning 2's until February 1965.

The Leconfield Wing, comprising Nos. 19 and 92 Squadrons, became the only regular units to fly F.2's commencing with 19 Squadron which received its first aircraft, XN 775, on 17 December 1962. By early the following summer both squadrons were fully operational and already participating in various combat exercises. From 1964 both squadrons practised ground attack strikes and frequently flew many of their aircraft in the four-cannon configuration. The same year No. 92 Squadron's blue-finned Lightnings provided the main Fighter Command aerobatic team which as usual, took part in the Farnborough Air Display. The following year No. 19 Squadron was chosen to participate in the proving trials involving the new Victor K.1 flight refuelling tankers. On 23 September the squadron left Britain for Gutersloh, in Germany, where it became the first supersonic squadron in the R.A.F.'s 2nd T.A.F. 92 Squadron followed suit on 29 December, moving to Geilenkirchen, although it rejoined 19 at Gutersloh in February 1968, soon after which both squadrons progressively had their F.2's rebuilt as F.2A's, although a handful of aircraft remain unconverted and are flown in the target facilities role in Germany at the present time.

The F.2 can be considered the last of the "first generation" Lightnings, for the next in line, the F.3, was a more powerful and more sophisticated breed, which had been developed over a period of several years, with some of the 20 XG-serialled pre-production Lightnings being used to test the systems, armament, aerodynamics, and powerplants of the new variant. The F.3 was designed around a new weapons system, the main components of which were the de Havilland Red Top air-to-air missile, and an advanced type of Ferranti Airpass airborne interception radar (A.I.23). The Red Top, although developed from the infra-red seeking Firestreak, was primarily intended as a collision course weapon, as opposed to the pursuit Firestreak. Firestreaks could still be fitted as an alternative, and in practice a squadron usually operates

WG 760 just on touchdown with braking chute streaming. (BAC via A. P. de Jong)





Lightning F.1 XM 144 in the rare "Golden Arrow" markings of No. 60 MU, see side-view illustration G2. (D. Sargent via Roger Levy)

several aircraft with each type of missile to provide a useful "mix". With the Lightning F.3 the two 30 mm. Aden cannon were deleted from the upper nose, and other structural changes were made, the most obvious being a re-designed, square cut fin, offering a 15% increase in area to compensate for the larger Red Top missiles, and external cable ducting was also extended forward on the fuselage sides. The Lightning F.3 was powered by new Avon 301 series turbojets of increased thrust, rated at 11,100 lb. st. thrust dry, and 16,300 lb. with reheat, which was fully variable. Although a small increase in fuel capacity was made possible by some of the structural revisions this gain was more than offset by the greater fuel consumption of the more powerful engines, and endurance, always something of a shortcoming of the Lightning, was even more critical on the Mark 3. Happily the aircraft's in-flight refuelling capability, with its very effective employment for combat air patrols as well as overseas redeployment, has largely nullified what might otherwise have been a major handicap.

XP 310, an early pre-production Lightning, was extensively modified by English Electric and served as a prototype for the F.3, in which configuration it first flew from Warton in March 1962. It was followed on 16 June 1962 by the first production aircraft, XP 693, flown by Sqn./Ldr. Jimmy Dell, who had by this time succeeded Roly Beumont as chief test pilot, although the latter remained very closely involved with Lightning development.

Considerable development work prevented the Lightning 3 from being released for service use until late the following year, and it was not until 1 January 1964 that the first such aircraft was handed over to the RAF when XP 695 was flown from Warton to Binbrook for the AFDS. Altogether this unit received four F.3's, only two of which remained in use by 1 February 1966 when the AFDS became the Fighter Command Trials Unit (FCTU), XP 696/S departing soon afterwards, on the sixteenth of the month for the A. & A.E.E., while the original XP 695/R soldiered on until 7 July when it was flown to 60 MU.

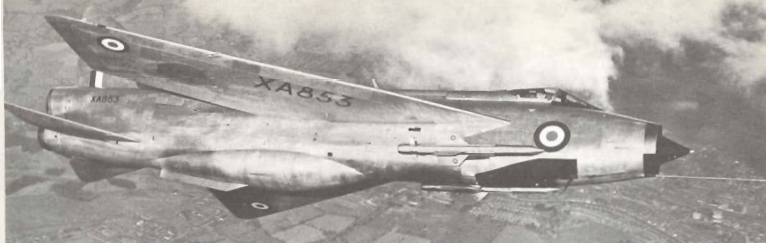
With the delivery of XP 700 to Leuchars on 14 April 1964, No. 74 Squadron became the first regular squadron to receive the Lightning 3. 74's pilots found the F.3 had plenty of extra "poke" after their old Mark 1's, and as the summer passed the "Tigers" really lived up to their title with their new mounts. Tragedy struck on 28 August, however, when XP 704/H crashed before the watching crowd of squadron personnel and relatives at Leuchars while practising for the forthcoming Battle of Britain display.

August 18 had seen the arrival at Leuchars of XP 707 and 708, the first Lightnings for 23 Squadron which began to re-equip from Javelin FAW.9R's the following month, with new aircrew, but retaining the majority of ground crews. The Leuchars squadrons soon worked up to operational status and early in 1965 began to participate in flight refuelling exercises to extend their endurance. Initially these exercises were flown using USAF KC-135

tankers as the RAF had been deprived of its tanker force the previous year with the premature retirement of the Vickers Valiant, following fatigue problems, and a gap existed until sufficient Mark 1 Victor bombers could be modified for the tanker role. These became available in 1965 as Victor K.1's and K.1a's, normally based as a three squadron wing at RAF Marham in Norfolk. However, it soon became practice to detach tankers to strategic points along the routes on long range redeployment flights. It also became increasingly necessary to detach Victor tankers to Leuchars, to extend the endurance of the base's Lightnings which were being called upon more and more to intercept the Soviet reconnaissance aircraft which had begun probing flights to the north of Scotland in an attempt to acquire electronic intelligence and test Britain's air defences. Mostly these interceptions took place more than 200 miles from base and the provision of a flight refuelling tanker in the vicinity often became a necessity if the Lightning was to stay with the Russian aircraft until it had turned away from Britain.

There was great rivalry between "The Tigers" (74 Squadron) and "The Red Eagles" (23 Squadron), titles which stemmed from their squadron badges but which were perpetuated by the carefully designed and brilliantly coloured markings which adorned their aircraft: 74 carried its traditional black and yellow "Tiger stripe" dicing on the nose of each Lightning, while the spine and fin were black, with a large tiger's face painted on a white disc adorned the fin. The aircraft code letter also appeared on the fin, painted in yellow. 23 Squadron's Lightnings had white spines and fins, whereon a large red and black eagle proclaimed the squadron's title; the nose markings comprised blue/red/blue bars on each side of the roundel, and like 74's markings had their origin in the colourful era of RAF biplanes in the thirties.

Even these beautiful markings were to be outshone by those of the Wattisham squadrons, which began to re-equip with Lightning 3's in December 1964 when 111 Squadron received its first aircraft of this mark; some of their new F.3s, still bereft of markings, took part in the fly-past during the state funeral of Sir Winston Churchill, on 19 January 1965, "Treble One" based their markings on those used by their earlier F.1a's, with black and yellow spine, and a black fin with broad yellow diagonal stripe on which the squadron's "Cross of Jerusalem" appeared in black and red. Lightning flashes were retained on the nose. Some experimentation with the positioning of the aircraft code letter and the swept back fin flash, until all aircraft were standardised in April 1965, by which time the rival 56 Squadron at the same base had received most of its Lightning 3's and had introduced probably the most sensational Lightning markings of all time. The entire fin was covered in large red and white chequers, even the fin flash being deleted; forward of the nose roundel a new red and white arrow-head marking was painted, within the centre of which was a white disc bearing the squadron's phoenix motif; unusually, the individual aircraft code was applied to the air brakes on the rear fuselage of the aircraft. One of 56's



XA853 a P.1B with redesigned fuselage featuring a new cockpit affording better visibility, dorsal spine, central shock cone within which the Airpass radar was to be housed and a pair of dummy Firestreaks. (BAC via A. P. de Jong)

aircraft in this scheme, XP 765/N, was displayed at RAF Cranwell on 6 September 1965 during Exercise "Union '65", with dummy over wing tanks (the shape of things to come). These were in natural finish although the pilot avowed that they, too, would soon be covered in red and white checkers!

111 Squadron meanwhile had also been receiving plenty of publicity, having formed a 12-aircraft aerobatic team from its total strength, of 12 F.3's and single T.4 (later replaced by a T.5), which called for a very high standard of serviceability. Its first major display being given at Le Bourget during the Paris Salon in June, where its thirteenth aircraft was displayed statically.

Sadly by the end of 1965 the flamboyant markings of the Lightning units came to an abrupt end, officialdom reared its ugly head and plain conformity became the order of the day; the nose markings were in the main unaffected, but the colourful paintwork on fins and spines was quickly stripped, and in its place each unit carried its motif set against a small white disc of uniform size on the fin. As the years passed more colourful markings cautiously returned, but with the exception of two overseas units these have never attained their former splendour.

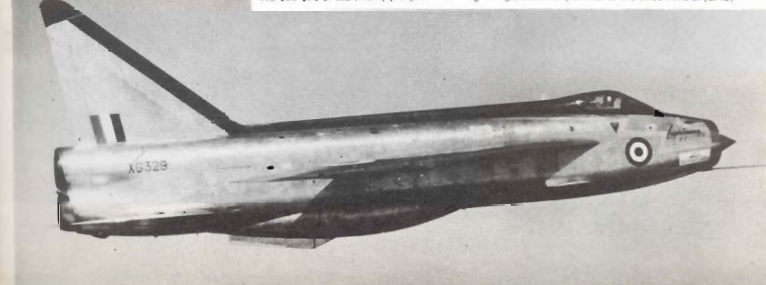
In October 1966 56 Squadron took part in the Malta air defence exercise "ADEX 66"—a prelude of things to come, for in April 1967 the squadron left Wattisham for Akrotiri in Cyprus, which then became its new home. Its place at Wattisham was taken by No. 29 Squadron, previously a Javelin 9 unit in Cyprus, which reformed at the Suffolk base on 1 May 1967. Most of its Lightning 3's were former Leuchars machines, displaced by the introduction of Lightning 6's at that base. 56 Squadron also re-equipped with Mark 6's in September 1971, leaving 29 and 111 as the only regular squadrons still flying F.3's. 226 OCU at Coltishall received a few Mark 3's in the summer of 1970 and use these in the advanced

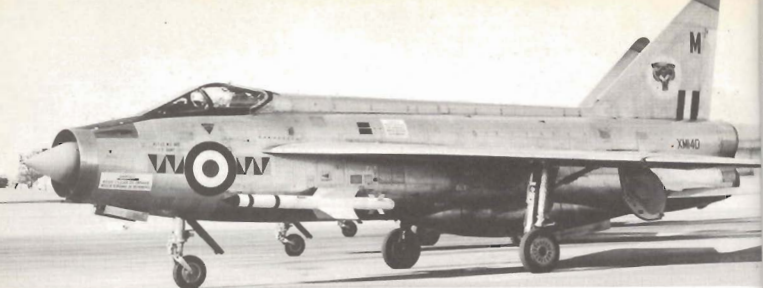
training role. The Lightning F.3 was built in greater quantity than any other variant, more than 50 of which were originally delivered to the RAF, and it is possible that some aircraft of this mark may be up-dated to a later standard if the money can be found.

Dual-controlled counterpart of the F.3 is the T.5, the prototypes of which were XM 966 and 967, which were converted from T.4's by Bristol at Filton, 967 flown by Jimmy Dell making the initial flight in T.5 configuration on 29 March 1962. The forward fuselages of production Mark 5 Lightnings were also manufactured at Filton. Like its dual-controlled predecessor the T.5 was designed to be fully capable of assuming the interceptor role as and when required, and has been used as such during its squadron service. The first unit to receive the T.5 was 226 OCU on 20 April 1965, when XS 419 was delivered to Coltishall. The OCU received rather more than half of the 20 T.5's issued to the RAF, and the type still serves with the advanced training squadron of the unit at the present time, where they are used to give operational training to pilots earmarked for squadrons flying the F.3 or F.6. Squadrons equipped with these marks also each have a T.5 for continuation training and instrument check-outs.

In an attempt to overcome the lack of endurance of the Lightning, and in particular of the F.3, the manufacturers had drawn up proposals to augment the fuel capacity in anticipation of future RAF requirements for greater combat patrol time and unrefuelled range for rapid overseas re-deployment. In fact by 1963 the RAF requested just such improvements in endurance and a considerably modified derivative of the F.3 was thus born. Basically this aircraft had a considerably enlarged ventral fuel tank, which was non-jettisonable in contrast to other variants. In addition it was proposed to strengthen the wing structure to take strong points for extra jettisonable tanks. Because of the location of the undercarriage

XG 329 one of the twenty pre-production Lightnings, essentially similar to the three P.1B's (BAC)





No. 74 Squadron based at Coltishall was the first operational squadron to be equipped with the Lightning, the first of its twelve F.1's being taken on strength on 29 June 1960. (Peter R. March).

it was not possible to mount them underneath the wing, and so the drop tanks were fitted to pylons above the wing.

To offset any loss in performance the aircraft was further modified by having a cambered leading edge extension to the outer wing section, similar to those fitted to the P.1A WG 760. The result was to increase range at high subsonic speeds by almost 20%, without any significant loss in supersonic speed. This modification, together with an increase in fuel capacity of over 1,000 gallons (500 gallons in ventral tank, and 260 in each over-wing tank) endowed the new Lightning with a much enhanced range/endurance. The new type, initially referred to as the Mark 3a, or 3*, was soon officially designated the F.6 for RAF service. The prototype F.6 was XP 697 (originally the fifth production F.3), which made its first flight after modification from Filton on 17 April 1964, in the hands of Roly Beamont. Other Lightnings were also used in the development of the F.6, notably XP 693 (originally the first production F.3), and XN 724 and 725 (second and third F.2's), used for systems trials, performance assessment, and over-wing tank tests. Originally the over-wing tanks were fitted with small square tipped fins, but these were found to be unnecessary.

So impressed were the RAF by the performance offered by the F.6 that the latter part of the F.3 contract was changed to the F.6, and a number of F.3's already on the production line were held back and modified to F.6 standard before delivery. The first production Lightning F.6 was XR 752, which flew on 16 June 1965, although this aircraft and those serialised up to XR 767 were actually only Interim F.6's, and although externally indistinguishable from the genuine article they lacked provision for over-wing tanks and some other internal modifications. Subsequently these Lightnings were later withdrawn from RAF service and modified by BAC to full F.6 standard.

XR 753 was delivered to Binbrook on 16 November 1965 as the first F.6 for the RAF, and became "T" of the AFDS, being re-coded "U" shortly afterwards, and followed on the twenty-sixth of the month by XR 752 which became "V". They were supplemented by two further F.6's the following February, and these four aircraft continued to be operated until the unit was disbanded on 30 June 1967, having been re-named Fighter Command Trials Unit since 1 February the previous year.

Deliveries of Interim F.6's continued in December 1965 to a brand new Lightning unit, No. 5 Squadron, which had reformed at Binbrook on 8 November, with a solitary Hunter T.7A, WV 318 as its sole aircraft for several days. This machine was one of only eight Hunter T.7's modified to incorporate the special OR 946 instrumentation of the Lightning F.3 and F.6. Their function was to serve as systems trainers pending the

availability of the Lightning T.5, and in this role the Hunter T.7A had a very brief career. This was certainly true in 5 Squadron which received its first Lightning, a T.5 XS 451 "T", on 19 November. On 10 December its first pair of Mark 6's were delivered, XR 755 "A", and 756 "B". Another early delivery was XR 754 "G" which had previously served briefly with the RAF Handling Squadron at Boscombe Down.

The production rate of Lightnings had never been spectacular and at about three aircraft a month it was not until 8 March 1966 that 5 Squadron received its twelfth and last Lightning 6, XR 765, which became "M". This slow delivery rate hampered the squadron from becoming fully operational until later in the year.

74 Squadron, which had been first with Lightning 1's, and 3's, also became the first squadron with full production standard Mark 6's, when it received XR 768 in August 1966, which became "A". Because of the slow build up of aircraft 74 flew a mixture of F.3's and F.6's throughout the winter of 1966-67, one of each variant being depicted in contemporary photographs showing a Soviet "Bison" reconnaissance plane being "escorted" away from British shores.

In January 1967 enough F.6's were on strength to begin to utilise the new aircraft's endurance capabilities, and five-hour flights around the U.K. cruising at 55,000 feet (except to descend for a flight refuelling hook-up) became the norm. This "conditioning" was put to the test later in the month when four "tanked-up" Lightnings of 74 Squadron flew non-stop from Leuchars to Akrotiri. It soon became clear that even greater distances could be spanned with the F.6 and flight refuelling, but the chief limiting factor was one of pilot fatigue. Sitting in a small cockpit, tightly strapped and trussed in heavy, uncomfortable survival clothing, continually breathing oxygen, and concentrating hard on navigation and tanker rendezvous, with four or five air-to-air refuelling contacts thrown in, can hardly be described as a sinecure! However, all this was merely a prelude of things to come.

Meanwhile in March the squadron was involved in intensive trials of an arrester hook system developed in conjunction with BAC. A spring-loaded arrester hook was fitted flush with the rear fuselage of the Lightning, and could be released by the pilot to engage a wire stretched across the runway, 400 yards from the upwind end. Known officially as the Rotary Hydraulic Arrester Gear, but colloquially as the "Water Twister", this system for emergency arrest has since been fitted to all Lightning 6's and 2A's, and at the bases from which they operate.

74 Squadron's proficiency in flight refuelling and maximum endurance flights was put to the test in Exercise Hydraulic—the transfer of the squadron from Leuchars to its new permanent base of Tengah, on Singapore. The exercise began from Leuchars on 1 June when ground support parties left Scotland by air for the staging posts



Line-up of F.1A's with the nose of a T.4 in the foreground of No. 56 Squadron, the first squadron to receive this Mark on 14 December 1960 with the arrival on strength of XM 172. Wattisham 1961. (S. P. Peltz)

to be used during the round-the-world flight. On 4 June six of 74's Lightnings left Leuchars, led by the C.O., Wg./Cdr. Ken Goodwin; five more left on the fifth, and the last two aircraft on the sixth. The aircraft were refuelled by a total of seventeen Victor tankers of Nos. 55, 57 and 214 Squadrons, and staged through Akrotiri (Cyprus), Masirah (Persian Gulf), and Gan Island (Indian Ocean). All 13 of the squadron's F.6's had arrived at Tengah by 11 June and were fully operational by the twelfth. XS 416 "T", the squadron's T.5, remained at Leuchars as it lacked the fuel capacity of the F.6's and would have required additional air refuellings. It was replaced by XV 329, shipped out to Singapore after 74's arrival.

74 Squadron became the sole RAF air defence squadron in the Far East Air Force soon after its arrival, and continued in this role for more than four years, during which time it distinguished itself in several air defence exercises which illustrated the interception capabilities of the Lightning. Notable among these were Exercise "Town House", in June 1969, when four of the squadron's Lightnings flew to Darwin, in Northern Australia, being air refuelled three times *en route* by Victors. The exercise lasted seven days during which the four Lightnings attained an exceptionally high "kill" rate and maintained good serviceability. In August 1970, Exercise Bersatu Padu, a five-nation, multi-service exercise in Singapore and Western Malaya, once again proved the ability of the Lightning to give complete air superiority. On this occasion the aircraft flew standing air patrols, refuelled by Victors of 214 Squadron by night as well as by day, and were able to successfully intercept attacking Canberra and Vulcans well out to sea.

With the run down of British forces in the Far East 74 Squadron flew its Lightnings from Tengah to Akrotiri in August 1971, where most of them were handed over to 56 Squadron and 74 disbanded.

5 Squadron had meanwhile become the second squadron to be equipped with fully modified F.6's, trading in its interim models in the spring of 1967, and it was with ten of these aircraft plus the T.5 that it participated in ADEX 67, Malta's air defence exercise, being based at Luqa between 6 and 26 October. Before leaving the island most of the squadron's Lightnings were adorned with a dayglo Maltese Cross marking above the fin flash.

The following year four of No. 5's Lightnings went farther afield when on 20 May they flew non-stop from Binbrook to Bahrain, covering the 4,000 miles in eight hours, and being air refuelled *en route* by Marham's Victors. On 29 August the squadron was presented with the Dacre Trophy, awarded for weapons proficiency to the top U.K. fighter squadron—an award it was to win again, and in September 5 Squadron put up two Lightnings for a flight refuelling demonstration at the Farnborough Air Show, and in July 1969 contributed six Lightnings for the fly-past during the Investiture of

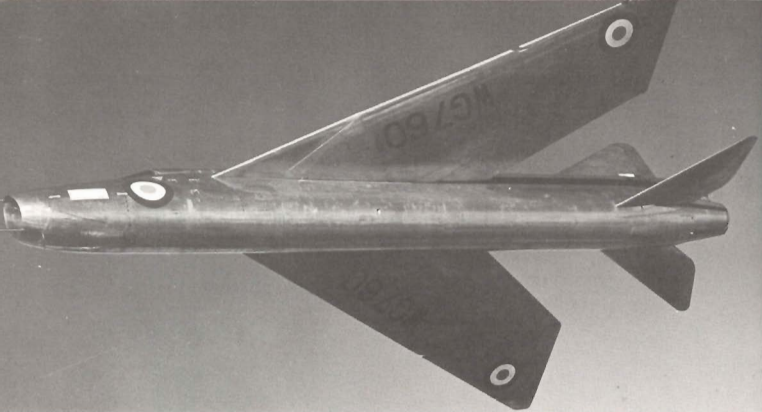
Prince Charles at Caernarvon, flying from Fairford for the occasion. Early in 1970 the squadron deployed to Singapore where it took part in local defence exercises, and ferried replacement Lightnings to 74 Squadron, returning with one or two of that unit's aircraft which were due for major overhaul in the U.K. Soon afterwards the squadron clearly identified itself by encircling the fin badge on their aircraft with a large red "S". This was partly the inspiration of the new C.O., Wg./Cdr. George Black (of "Linton Blacks" fame), who had earlier displayed his penchant for improving squadron insignia while C.O. of 111 Squadron some six years previously.

In May 1970 5 Squadron gained yet another accolade when it won the Huddleston Trophy as the top NATO interceptor squadron, after a competition spread over a period of two months, involving more than 200 sorties in all weather conditions and pitted against Mirages, F-102's, and F-104's from eight other air forces in Europe.

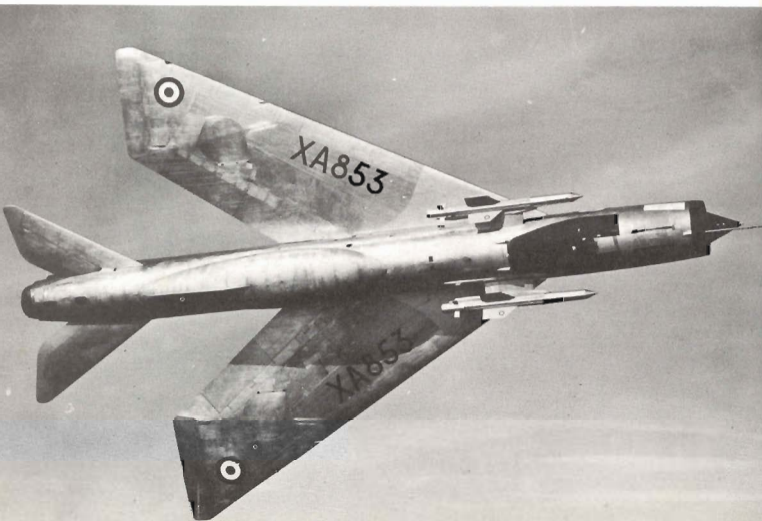
Next Lightning 6 squadron was No. 11, which reformed at Leuchars on 1 April 1967 to take over the air defence task from 74 Squadron before that unit moved to Singapore; 11 Squadron officially assumed 74's defence responsibility on 15 May at a ceremony in which all three of Leuchars' Lightning squadrons participated (Nos. 11, 23, and 74). It was in May, too, that 23 Squadron began to re-equip with F.6's; these were of the interim model, six of which were acquired, and were distinguished by late alphabet code letters. In July and August aircraft to full production standard were received, but it was the turn of the year before the full complement of 12 fighters were of this type. Among these F.6's was XS 938, the last Lightning for the RAF, which was delivered on 28 August 1967 and became "E". Also there were several aircraft which had originally served with 5 Squadron as interim 6's but had subsequently been modified to full production standard.

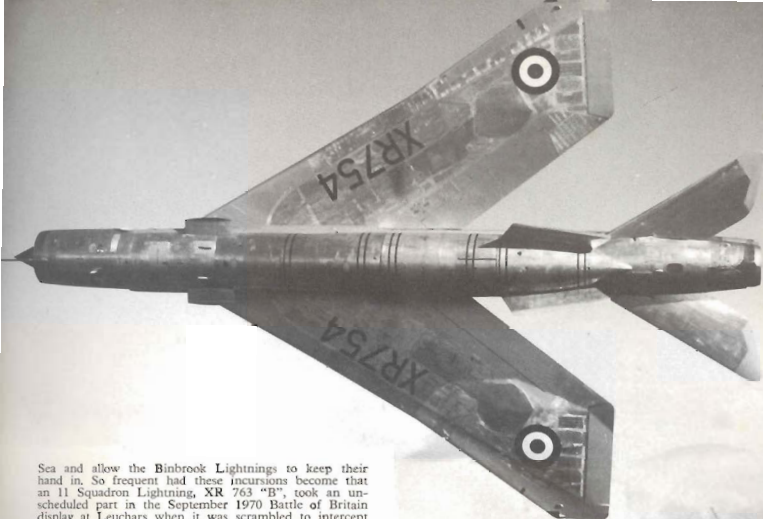
The following year 23 Squadron hit the headlines when it made the first Transatlantic Lightning flight (non-stop, using light refuelling). Two aircraft, XR 725 "A" and XS 936 "B", left Leuchars on 28 August to participate in the Toronto Air Show (and gain experience for the Daily Mail Air Race the following year—from which the Lightnings were later withdrawn). After several very well received displays the two aircraft returned to a champagne welcome at Leuchars on 3 September.

Life at Leuchars was not all champagne, however, and thanks to the Soviet air force there was regular interception practice for both 11 and 23 Squadrons, as the number of intrusions into British airspace dramatically increased to a rate which now averages about one a day. Leuchars gets most of this "trade" because the Russian reconnaissance aircraft usually track down off the Norwegian coast around the top of Scotland into the Atlantic where their surveillance of Allied shipping is maintained. Occasionally they "stray" down the North



Three photographs which show the changing shape of the Lightning from the P.1 prototype above, a P.1B below, the first of the true Lightnings and on the facing page an early F.6. (Photos BAC)





Sea and allow the Binbrook Lightnings to keep their hand in. So frequent had these incursions become that an 11 Squadron Lightning, XR 763 "B", took an unscheduled part in the September 1970 Battle of Britain display at Leuchars when it was scrambled to intercept a Russian aircraft off North West Scotland. Upon its return some one and a half hours later the display commentator explained its hurried departure and announced, amid applause from the large crowd, that the Russians had been successfully persuaded to alter course away from the British Isles. Relationships between Lightning pilots and the crews of Soviet reconnaissance bombers are generally affable, with each smiling or waving at the other, and photographing each other's aircraft for intelligence purposes. However, the Russians have been known to reduce speed to such an extent that the accompanying Lightning finds it difficult to remain in formation without stalling. The Lightning pilots for their part have been known to cause the Soviets some embarrassment!

Normally two Lightnings are on IAF (Interceptor Alert Force) duty in a pair of special hangars positioned a few yards from the west end of the runway at all U.K. Lightning bases. This force (known as Q.R.A.—"Quick Reaction Alert"—until May 1971) is kept at immediate readiness, 24 hours a day, every day, waiting for the signal which will scramble the Lightning to intercept any unidentified radar plot which approaches British shores. Normally only one aircraft is scrambled, the other acting as a reserve. In addition to these two aircraft other machines from each squadron are usually available at longer periods of readiness. Lightning squadrons operate in two flights, normally one flight being on "days" while the other is on "nights", each flight alternating weekly.

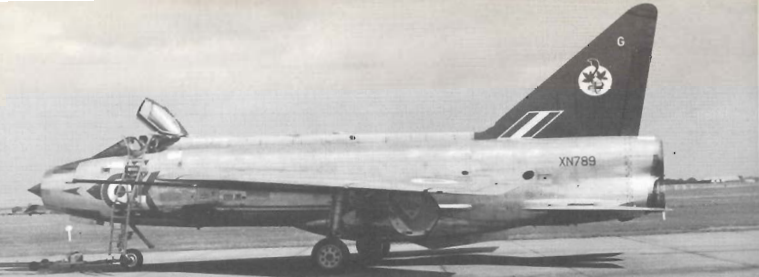
In addition to overseas redeployment exercises every Lightning squadron completes a period of live weapons practice at the Missile Practice Camp at RAF Valley in Anglesey, where the infra-red seeking Firestreaks and Red Tops are fired at flares behind Jindivik pilotless target drones. During 1971 the RAF's Lightning F.6's were progressively modified to accommodate a gun pack containing two 30 mm. Aden cannon fitted in the forward compartment of the ventral tank, similar to that first developed for the export F.53 Lightning. This dual armament capability is considered to be more suitable for

interception duty, and the cannon armament is not quite so final in any awkward confrontation with Russian aircraft.

In February 1972 No. 11 Squadron moved south to join 5 Squadron at Binbrook, leaving the Russians in the capable care of 23 Squadron and the Phantoms of 43 Squadron.

Latest mark of Lightning to enter RAF service is the F.2A, the first example of which was delivered to 19 Squadron in Germany, during May 1968, and continued throughout the next 18 months to both 19 and 92 Squadrons in Germany as their F.2's were progressively withdrawn and converted to the new standard by BAC, and re-issued. The conversion consisted mainly of fitting the enlarged ventral fuel tank and extended, cambered wing of the F.6 (but not stressed for over-wing tanks), the square-tipped fin of increased area, and an arrester hook. Armament remained unchanged at two 30 mm. cannon in the upper nose, and two Firestreaks or gun/rocket pack in the lower weapons bay. In practice the Gutersloh squadrons often fly in this four-gun configuration. At least one Lightning F.2A, XN 733, has appeared with a pair of Aden cannon fitted to the forward portion of the ventral tank; this aircraft was shown in this configuration at the 1970 Farnborough Air Show, although it subsequently reverted to normal layout before delivery to 19 Squadron as "Y" the following year. Of the original total of 44 Lightning F.2's over 30 have been converted to F.2A standard, while three or four unmodified aircraft continue to serve in the target facilities role with 19 and 92 Squadrons. It was originally intended that most Lightning 3's would be converted to F.6 standard, but the limitations on defence expenditure may now preclude such a conversion programme.

Reference to the conversion and modification of RAF Lightnings would be incomplete without mentioning the considerable and continuing work of BAC at Preston and



Above: First deliveries of the F.2 went to Nos. 19 and 92 Squadrons comprising the Leconfield Wing, both squadrons becoming operational during the summer of 1963. Above an F.2 of No. 92 Squadron and left a rebuilt F.2 to F.2A configuration of No. 92 Squadron at Gutersloh, West Germany in 1971 markings.



the RAF maintenance units in up-dating, refurbishing, and rebuilding these aircraft.

The first RAF maintenance unit largely concerned with Lightning overhaul, repair, and storage was No. 33 at Lyneham, Wiltshire. It was here, in 1966, that one of the most dramatic incidents ever to have involved a Lightning took place.

The aircraft in question was XM 135, the second production F.1, held by 33 M.U. in an attempt to diagnose an electrical fault. Normally a test pilot was "borrowed" from the A & AEE at Boscombe Down, but none was available for several days and so the C.O. of the M.U. decided to carry out the tests himself as these did not require any flying. The tests involved opening up the engines to 85-90% power, releasing the brakes, and making a short run along the runway after which the throttles were to be closed. For the test several parts of the Lightning were removed, including the canopy, and the ejection seat was not armed.

The C.O. of 33 M.U. was a technical officer, and although a qualified pilot he had not kept in current flying practice since 1957. After familiarisation of the Lightning's taxiing characteristics, three test runs were made without incident. On the fourth run the C.O. inadvertently went beyond the 90% power setting and engaged reheat! Distracted by a vehicle crossing the runway, it took him several seconds to realise what had happened, by which time the end of the runway was fast approaching; he therefore elected to remain in reheat and take off.

Since the seat was unarmed he couldn't eject and therefore decided to try to land. After four hair-raising attempts he finally succeeded in landing—flapless so as not to alter the trim, crossing the threshold at about 160 knots, and so completed his first (and last) Lightning solo. XM 135 has subsequently given valiant service as a target facilities aircraft.

With the demise of 33 M.U. at the end of 1966 much of its work was absorbed by 60 M.U. at Leconfield, where the Lightning Servicing Squadron undertakes most

major overhauls and much modification work. The I.S.S. normally has the services of at least one Lightning test pilot at its disposal, who often keeps his hand in by air-testing aircraft which are held in reserve as replacements. Two of 60 M.U.'s Lightnings have carried distinctive markings by way of identification, comprising a long red and yellow arrow (adapted from the Leconfield station crest) set against a white rectangle on the nose, and the station badge on the fin. XM 144, an F.1, was so adorned in 1967, replaced in September by an F.6 XR 726 until 1 February when it was issued to 5 Squadron; each of these aircraft was locally known as the "Golden Arrow".

The development of the Lightning to meet RAF requirements for increased range has also been instrumental in the successful adaptation of the aircraft for export. The enlarged ventral tank capacity and cambered extended wing, strong enough to take over-wing tanks, made the F.6 a worthwhile selling proposition which BAC were quick to realise. The forward section of the ventral tank was designed so that it could be interchanged with a self-contained pack comprising two Aden cannon with 240 rounds of 30 mm. ammunition per gun, while the lower weapons pack could accommodate either two guided missiles (Red Tops or Firestreaks), or 44 2 in. rockets (capable of being fired in ripples), or a reconnaissance pack containing five Vinten cameras allowing vertical, oblique, and forward photography, for day or night use, and with line-scan. The export version of the Lightning 6, designated the F.53, had specially strengthened over-wing stores points so that each could carry a 1,000 lb. bomb instead of a fuel tank, while an additional hard point for pylon mounted weapons was provided under each wing outboard of the wheel well. The underwing pylons are capable of carrying stores up to 2,000 lb. in weight, either bombs or various combinations of Matra SNEB 68 mm. rockets.

These modifications transformed the Lightning from a Mach 2+ interceptor into an aircraft which could be quickly adapted to strike, reconnaissance, or interception duties; or a combination of all three! Moreover, it was



Long-range tank detail shots, above on an F.2 and below on an F.3. (BAC)

an aircraft with great inherent strength and fine handling characteristics, and while it was undoubtedly filled with a considerable amount of sophisticated equipment, the bugs had been thoroughly rung out during five years of squadron service with the RAF.

Strenuous sales efforts were made to countries in South America, the Far and Middle East, and even in Europe, despite the almost total reliance upon U.S. fighter aircraft. Success was not easily achieved, primarily because the Lightning was expensive to buy and costly to operate, however, Saudi Arabia showed some interest and eventually decided to purchase 34 F.53's and six T.55's as part of a complete air defence package which also included other BAC products. The T.55 was developed in parallel with the F.53 as a dual-controlled development of the RAF's T.5, but featuring the large belly tank and cambered wing (there are no plans for RAF T.5's to be so modified).

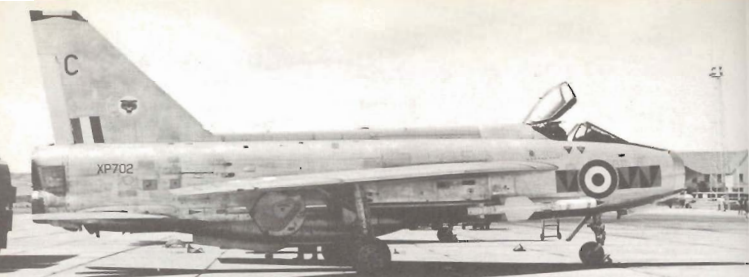
The first F.53, 53-666, made its maiden flight on 1 November 1966, and the first T.55, 55-710, two days later; both of these aircraft were originally ordered for

the RAF as F.6 XR 722 and T.5 XS 460 respectively, but were transferred to Saudi Arabia.

More than a year was to elapse before the first deliveries of these types to the Saudi Air Force took place, with F.53 53-667 on 12 December 1967 and T.55 55-711 on 18 December. These were not, however, the first Lightnings to be delivered to Saudi Arabia, because four F.2's, XN 767, 770, 796 and 797, had been sold to the Royal Saudi Air Force where they were re-serialled 52-655—52-658 and designated F. 52's. They were joined by two T.54's, 54-650 and 651, which had originally been RAF T.4's XM 989 (formerly "X" of 56 Squadron), and XM 992 (formerly "Z" of 111 Squadron, and "992" with 226 OCU).

These aircraft were used for training at Khamis Mushayt in Saudi Arabia where they were later supplemented by several F.53's and T.55's which were delivered throughout 1968 by British pilots, mostly civilians employed by BAC and Airwork Services Ltd. who had a contract to train both air and ground crews. A little known fact is that some serving RAF Lightning pilots





First deliveries of the F.3 went to No. 74 Squadron with the arrival of XP 700 at Leuchars on 14 April 1964, photo shows the 1966 markings. (Roger Levy)

also ferried these aircraft to Saudi Arabia under civilian guise. Training of Saudi pilots was undertaken at 226 OCU, Coltishall, where four T.55's were employed during 1968 in addition to the OCU's F.1A's, T.4's and T.5's.

The Royal Saudi Air Force has concentrated most of its Lightnings in Nos. 2 and 6 Squadrons, and has operated them from Riyadh and Dhahran in addition to Khamis Mushayt. Mostly the aircraft are flown in the interceptor role, in which they represent the nation's first line of defence in a region where there is almost a constant threat of incursions by neighbouring states. Border disputes and the activities of rebel guerilla forces operating from the Yemen have already caused Saudi Lightnings to be used in ground strafing and anti-rebel strikes, during one of which 53-697 is reported to have crashed inside the Yemen on 2 May 1970. Certainly the Saudis have lost several of their Lightnings, but in the majority of cases these have been training accidents.

Another oil-rich Middle Eastern state became the second overseas buyer of Lightnings when Kuwait ordered 12 F.53's and two T.55's, shortly after Saudi Arabia's purchase. The Kuwait Air Force received their first Lightnings in 1968, and also operated their T.55's at 226 OCU while pilots received conversion training.

With the completion of the Kuwait order the Lightning production line was closed down, and with it the likelihood of any further exports, although there remains the faint possibility of ex-RAF aircraft being offered for sale should these ever become surplus.

Notes on RAF Lightning Markings

As the accompanying illustrations show, the Lightning has worn some of the most colourful markings ever adopted by RAF fighters.

Last Mark in service, the F.6 also went first to No. 74 Squadron in August 1966. The F.6 illustrated here is XS 936 of No. 23 Squadron. Note the ventral 30mm Aden cannon and the RCAF flash on the nose. (Roger Levy)



Although camouflage was considered for the Lightning in the late 1950s, the idea was dropped in favour of a highly-polished natural metal finish, because it was anticipated that paintwork would wear badly at high supersonic speeds, and offer little concealment in the high altitude environment in which the Lightning was most likely to see combat unless a matt finish was used—and this meant a penalty in performance.

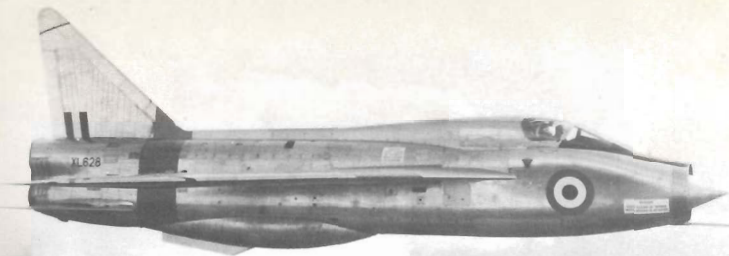
Lightning T.4 and T.5 trainers were originally delivered with yellow training bands across the wings and rear fuselage. These were usually repainted in fluorescent orange/red dayglo in service, before being removed entirely at the end of 1965. The Lightning F.2A's at Gutersloh are currently being camouflaged!

Pilot's Names

In addition to the colourful unit insignia most Lightnings in RAF service carry a pilot's name beneath the port side of the cockpit. Usually this is in black capital letters, but on some units (e.g. 11 and 23 Squadrons) the name appears in white on a small black panel. Because of servicing schedules the presence of a particular pilot's name on an aircraft indicates his preference for that machine rather than "ownership". On some units (e.g. 29 Squadron) ground crews responsible for servicing a particular aircraft also have their names printed beneath that of the pilot.

Rank Insignia

Squadron and Flight Commanders often add their rank pennants (Wg./Cdr. and Sqn./Ldr. respectively) beside their names. On TFF Lightnings the names of other officers such as the Wing Commander Flying, or even the Station Commander are displayed (e.g. Group



The prototype T.4 Lightning, note the size and position of the orange day-glo trainer bands. (BAC)

Captain A. D. Boyle, Station Commander at Binbrook, personalised XM 137 "Y", a Lightning F.1 of the base TFF.

Special Insignia

Participation in exercises, special flights, exchange visits with foreign fighter squadrons, overseas detachments, etc., almost invariably result in the application of a variety of temporary markings—usually applied by the ground crews. Such markings are so widespread and so transient that it would be impossible to give more than a handful of examples: 5 Squadron F.6's featured dayglo Maltese Cross markings above the fin flash after their participation in the island's air defence exercise in 1967; the two 23 Squadron F.6's which took part in the Toronto Air Show carried Union flags on their fins for their outward flight to Canada—these being replaced by "Air Canada" symbols at Toronto; 74 Squadron F.1 XM 135 "B" carried the black scorpion on a yellow disc insignia of 325 Squadron, R. Netherlands A.P., Soesterberg, following an exchange visit in May 1964; 74 Squadron painted an "Esso" tiger around the port nose roundel of T.5 XS 449 while this aircraft was on loan from 226 OCU during November 1966.

Following a visit to the CAF base at Bad Solingen, Germany, in 1971, many of 23 Squadron's F.6's carried miniature CAF markings on the nose; on one aircraft, XR 752/G, the additional inscription in yellow appeared: **MADE IN GREAT BRITAIN BY DINKY. PAT. PEND.** The pilot's name on this aircraft was **CAPT. GEIGER** (a USAF officer on exchange).

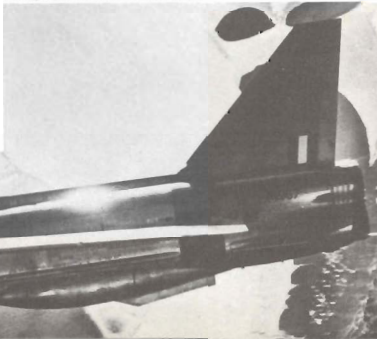
Dimensions & Performance Details of Lightning F.6

Span 34 ft. 10 in.
Length 55 ft. 3 in. (including probe).
Height 19 ft. 7 in.
Wing Area 460 sq. ft.
Weight 40,000 lb. empty, 50,000 lb. loaded (approx).
Maximum speed 1,500 mph (Mach 2.27) at 40,000 ft.
Initial rate of climb over 50,000 ft./min.
Time to 40,000 ft. 2-5 min.
Service ceiling in excess of 60,000 ft.

Representative Examples of Lightnings in RAF Service

5 Squadron F.6 (Interim) XR 756/B F.6 XS 925/L	111 Squadron F.1 XM 140/R F.1A XM 186/B F.3 XP 761/N
11 Squadron F.6 XR 769/J	226 OCU F.1 XM 134 F.1A XM 182 F.3 XP 752 T.4 XM 997 T.5 XS 422
19 Squadron F.2 XM 779/G F.2A XM 784/R	AFDS F.1 XM 138/G F.2 XM 726/K F.3 XP 896/S T.4 XM 973 F.6 (Interim) XR 753/T
23 Squadron F.3 XP 736/F F.6 (Interim) XR 752/U F.6 XR 765/A	Binbrook TFF F.1 XM 164/Z F.1A XM 181/Y
29 Squadron F.3 XP 755/E T.5 XV 328/Z	Leuchars TFF F.1 XM 145 F.1A XM 174
56 Squadron F.1A XM 174/Y F.3 XR 721/F F.6 XS 897/S	Wattisham TFF F.1 XM 163/A F.1A XM 177
74 Squadron F.1 XM 166/G F.3 XP 754/M F.6 XR 758/J	
92 Squadron F.2 XM 769/Z F.2A XM 788/P	

One of the two prototype T.5's XM 967, the other being XM 968, on a test flight over a wintry landscape. (BAC)



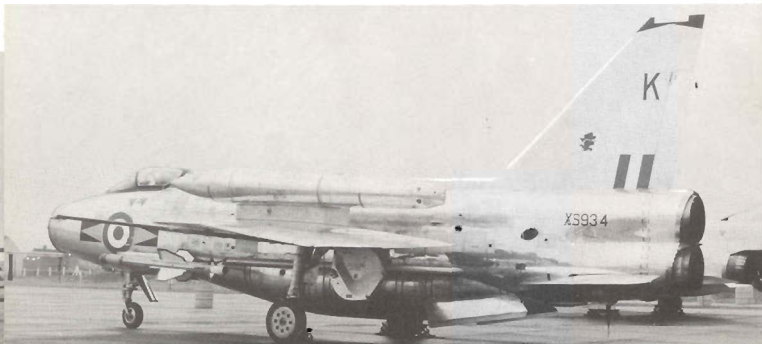


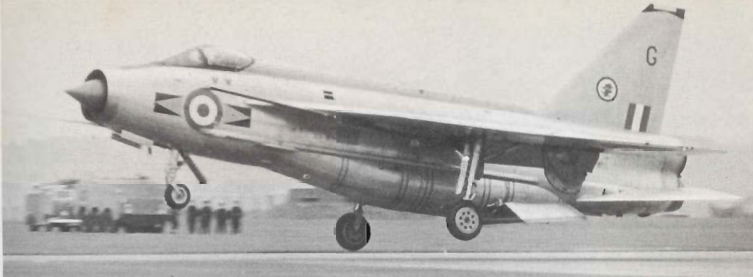
Above: F.1A of No. 5 Squadron, formerly X of Binbrook TFF, Topcliffe 3 July 1971, XM 169, note red 5 outlining the squadron insignia



Above: F.6, XR 755 of No. 5 Squadron equipped with over wing long-range tanks, Marham 1966.

Below: F.6, XS 934 of No. 11 Squadron, Leuchars, September 1967. (Photos Roger Levy)





Above: F.6 of No. 11 Squadron landing at Leuchars, September 1967.



Above: Line-up of F.6's of No. 11 Squadron at Leuchars in September 1971, note the traces of No. 23 Squadrons "Eagle" on fin.

Below: XS 934 taking-off at full bore, Leuchars, September 1968. (Photos Roger Levy)





Above: XR 763, an F.6 of No. 11 Squadron touching down at Leuchars after the successful interception of a Russian recon aircraft off N. Scotland, 19 September 1970.

Below: T.5 of No. 11 Squadron, note absence of ventral tank for servicing, Leuchars, September 1968.

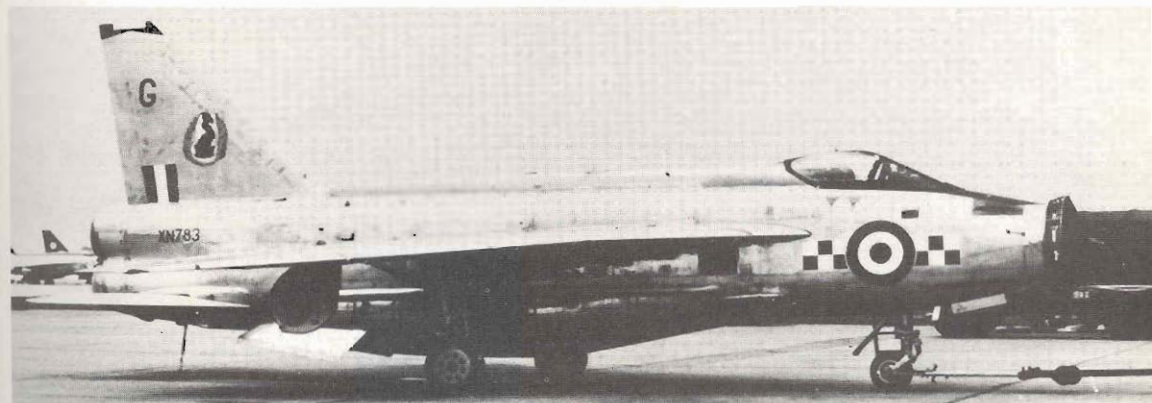


Below: An F.2 in the blue and white checks of No. 19 Squadron at Funningly, September 1963. (Photos Roger Levy)





F2A's of No. 19 Squadron, above XN 771 and below XN 783.



Below: An F.3 of No. 23 Squadron clearly displaying the scarlet and black eagle on the white fin, Finningly, September 1965. (Roger Levy)

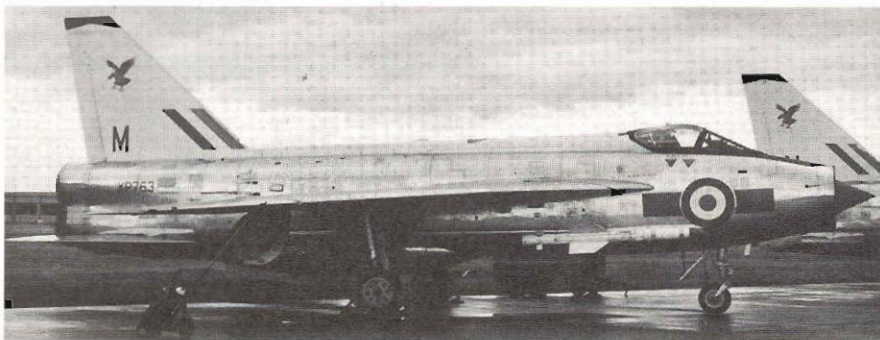




Left: F.3. XP 705 of No.23 Squadron still with the black 90 on nose, a relic of the Paris Air Show where this aircraft gave an aerobatic display, Wattisham, June 1967. (Paul Bennett via Roger Levy)



Left: Port and starboard views of F.3's of No. 23 Squadron, July 1967.

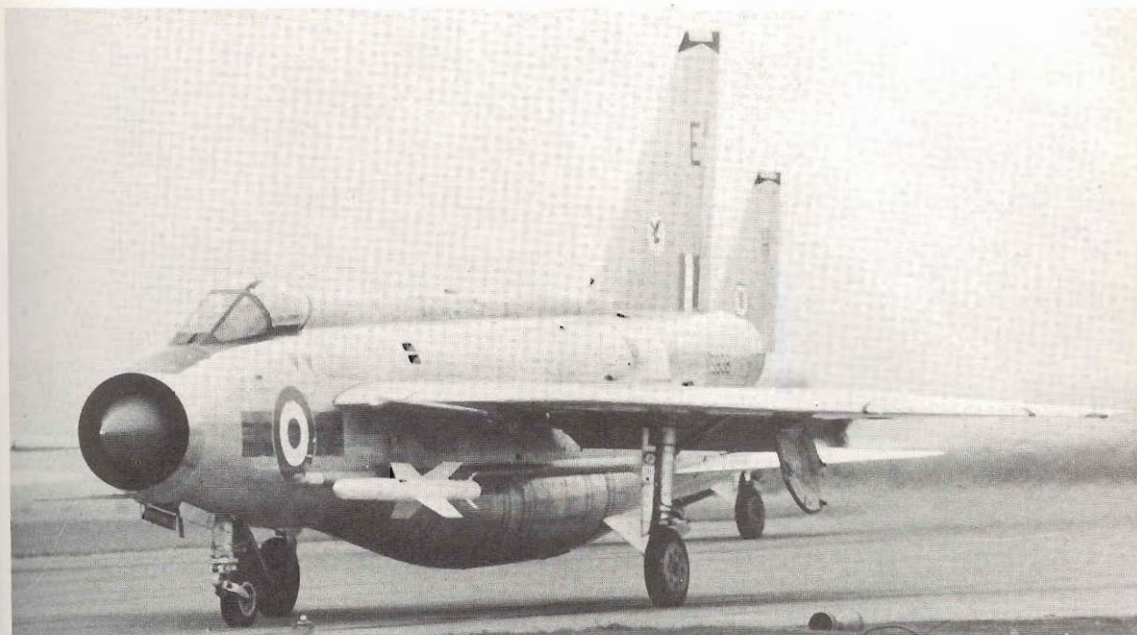


Below: Line-up of F.3's of No. 23 Squadron, note absence of white spine and tail, squadron insignia in white disc. (Roger Levy)





Above: Interim F.6 of No. 23 Squadron, XR 753. Leuchars, September 1967.



Above: F.6 XS 938 of No. 23 Squadron held on brakes whilst engines opened-up to full dry power for take-off, note the nose down attitude, Leuchars, September 1968.

Below: F.6 XR 725, No. 23 Squadron, note Air Canada badge on fin, one of two aircraft which visited the Toronto Air Show. Leuchars, September 1968. (Photos Roger Levy)





Above: F.6 XS 935, reserve aircraft for the Toronto Air Show, note Union Jack on fin.



The two F.6's, XR 725 above and XS 936 which visited the Toronto Air Show. (Photos Roger Levy)





From top to bottom XS 937, XR 727 and XR 765 in 1971 markings, note ventral cannon on top two aircraft. Leuchars, 1971.



Below: T.5 of No. 23 Squadron, XS 417. Leuchars 1967. (Photos Roger Levy)





Above: F.3 XR 715 of No. 29 Squadron, Wattisham, May 1971.



Left: F.3 XP 698 showing the smaller markings of 1967 vintage.



Left: A pair of No. 29 Squadron F.3's being re-fuelled by a Victor K.1A.



Below: XP 757 an F.3 of No. 29 Squadron taxiing along the perimeter track at Wattisham. (Photos Roger Levy)



A1
No. 5 Squadron,

1
Lightning F.6,
No. 5 Squadron, RAF, 1970.



A2
No. 11 Squadron.

2
Lightning F.6,
No. 11 Squadron, RAF, 1970.



A3
No. 19 Squadron.

3
Lightning F.2,
No. 19 Squadron, RAF, 1963.



4
Lightning F.3,
No. 23 Squadron, RAF, 1965.





B1
No. 23 Squadron,

1
Lightning T.5,
No. 23 Squadron RAF, 1967.



B2
No. 23 Squadron,

2
Lightning F.6,
No. 23 Squadron, RAF, 1971.



B3
No. 29 Squadron,

3
Lightning F.3,
No. 29 Squadron, RAF, 1967.



4
Lightning F.3,
No. 29 Squadron, RAF, 1971.





C1
No. 56 Squadron.

1
Lightning F.1A,
No. 56 Squadron, RAF, 1962-63.



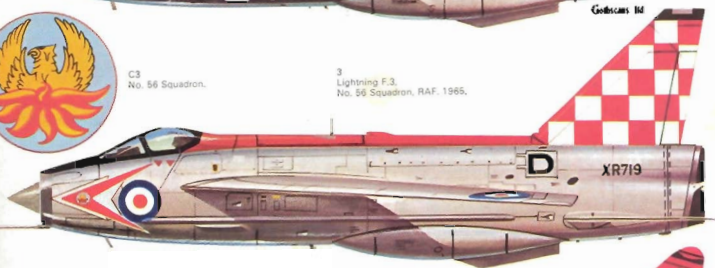
C2
No. 56 Squadron.

2
Lightning F.1A,
No. 56 Squadron,
THE FIREBIRDS, RAF, 1963.

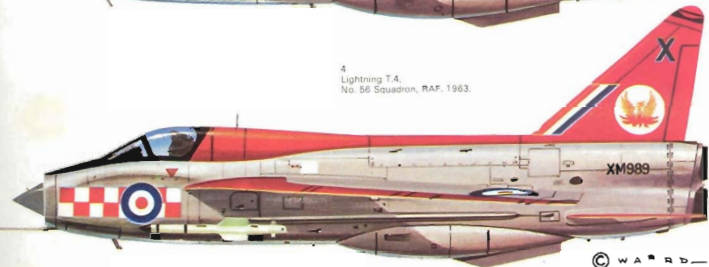


C3
No. 56 Squadron.

3
Lightning F.3,
No. 56 Squadron, RAF, 1965.



4
Lightning T.4,
No. 56 Squadron, RAF, 1963.





D1
No. 74 Squadron.

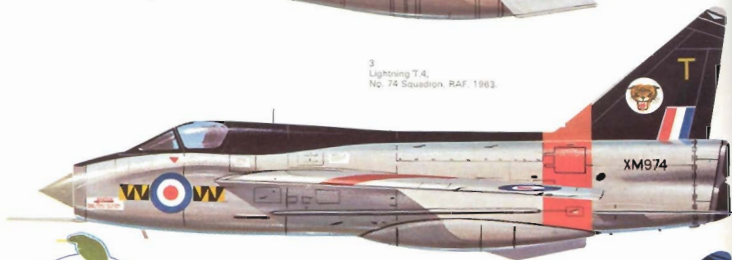
1
Lightning F.7,
No. 74 Squadron,
THE TIGERS, RAF, 1962.



2
Lightning F.6,
No. 74 Squadron, RAF, 1971.



3
Lightning T.4,
No. 74 Squadron, RAF, 1963.

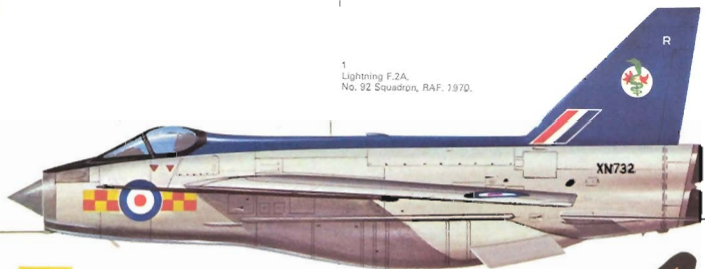


D4
No. 92 Squadron.

4
Lightning F.2,
No. 92 Squadron, RAF, 1964.



1
Lightning F.2A,
No. 92 Squadron, RAF, 1970.



E2
No. 111 Squadron.

2
Lightning F.1A,
No. 111 Squadron, RAF, 1964.



E3
No. 111 Squadron.

3
Lightning F.3,
No. 111 Squadron, RAF, 1965.



E4
No. 111 Squadron.

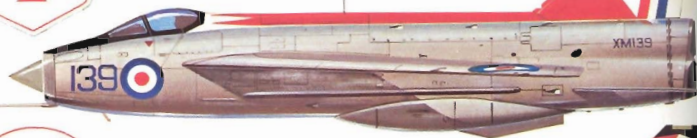
4
Lightning F.3,
No. 111 Squadron, RAF, 1971.





F1
No. 145 Squadron/No. 226 OCU.

1
Lightning F.1,
No. 145 Squadron/No. 226 Operational
Conversion Unit, RAF, 1964.



F2
Blinbrook TFF.

2
Lightning T.5,
No. 145 Squadron/No. 226 Operational
Conversion Unit, RAF, 1965.



F3
No. 65 Squadron/No. 226 OCU.

3
Lightning F.1A,
No. 65 Squadron/No. 226 Operational
Conversion Unit, RAF, 1971.



F4
No. 145 Squadron/No. 226 OCU.

4
Lightning T.5,
No. 145 Squadron/No. 226 Operational
Conversion Unit, RAF, 1970.





G1
RAF Leuchars.



G1A
Leuchars TFF.



G

1
Lightning F.1,
Leuchars TFF, RAF, 1968.
Ex. No. 145 Squadron/No. 226 OCU.



G2
Wattisham TFF.



2
Lightning F.1A,
Wattisham TFF, RAF, 1971.



G3
RAF Leconfield.



G3A
No. 60 MU.



3
Lightning F.1,
No. 60 MU, RAF.



G4
AFDS

4
Lightning F.1,
Air Fighting Development
Squadron, RAF, 1961.



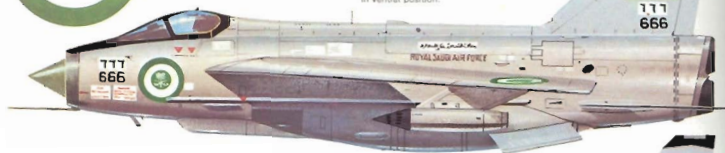


لَا إِلَهَ إِلَّا اللَّهُ مُحَمَّدٌ رَسُولُ اللَّهِ

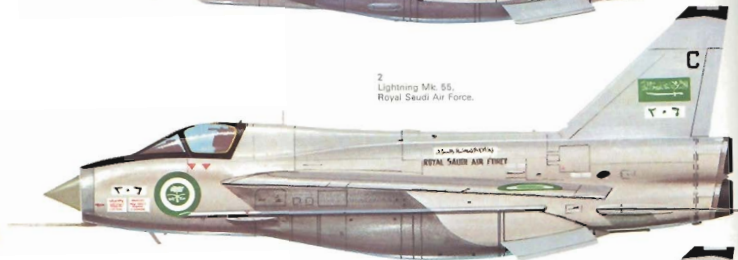
H1
Saudi Arabia.

H

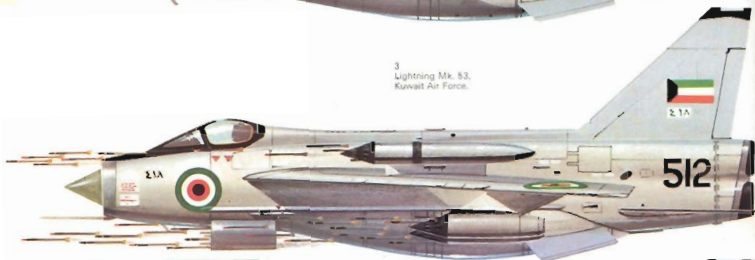
1
Lightning Mk. 63.
Royal Saudi Air Force. Equipped with
photo reconnaissance pack and two
Matra rocket launchers on under wing
pylons plus 2 x 30 mm Aden cannon
in ventral position.



2
Lightning Mk. 65.
Royal Saudi Air Force.



3
Lightning Mk. 83.
Kuwait Air Force.



H4
Kuwait.

4
Lightning Mk. 55.
Kuwait Air Force.





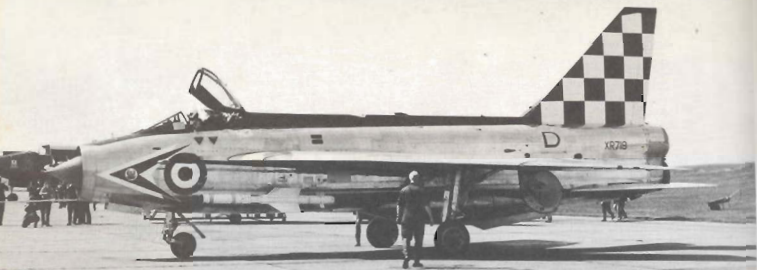
Above: F.1A's of No. 56 Squadron, the FIREBIRDS making smoke during a display in 1963. (S. P. Peltz)



Above: Line-up of F.1A's of No. 56 Squadron at Coltishall, 1963. (S. P. Peltz)

Below: XM 174 of the FIREBIRDS, note the insignia is on a white disc at this time, the usual presentation being a pale blue background to the Phoenix. (Roger Levv)



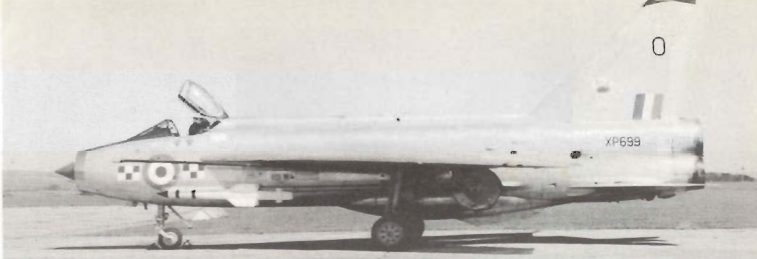


Above & below: Port and starboard views of F3 XR 719 of No. 56 Squadron in probably the gayest markings on any post-war RAF fighter squadron.



Left: Detail shot of the marking of No. 56 Squadron during the period of the red and white checks. No doubt the red and white checks of No. 56 and the colours of other squadrons on the spine and tails of the Lightnings impaired the operational efficiency of the aircraft to such an extent that officialdom just had to have them removed. (Photos Roger Levy)





Above: F.3 of No. 56 Squadron with the latest marking, six checks fore and aft of the roundel.



Above: XR 719 of No. 56 Squadron, note pale grey aft fuselage. This aircraft went on the strength of No. 111 Squadron as Z after a major overhaul at No. 60 MU. (Photos Roger Levy)

Below: T.5 of No. 56 Squadron taking-off from Wattisham. See cover illustration for colour details. (RAF/MoD via Air Pictorial)





Magnificent shots of F.11's of No. 74 Squadron performing aerobatics. (Flight International)





Above: An F.1 of No. 74 Squadron undergoing re-heat tests at Warton airfield, Preston. Note the hydraulic chocks against the main undercarriage wheels. (BAG)



Above: XM 135 an F.1 and below XP 702 and XP 751 F.3s of No. 74 Squadron with the black spine scheme. (Roger Levy above, RAF/MoD via J. W. R. Taylor below)





Above: F3 XP702 of No. 74 Squadron with small insignia obscured by wingtip, 1966. (Roger Levy)

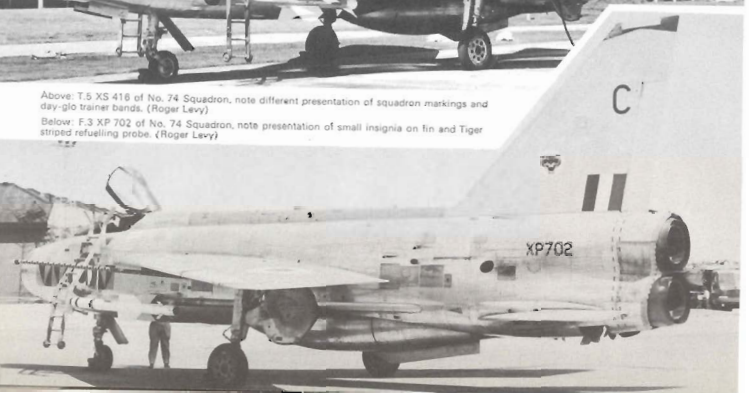


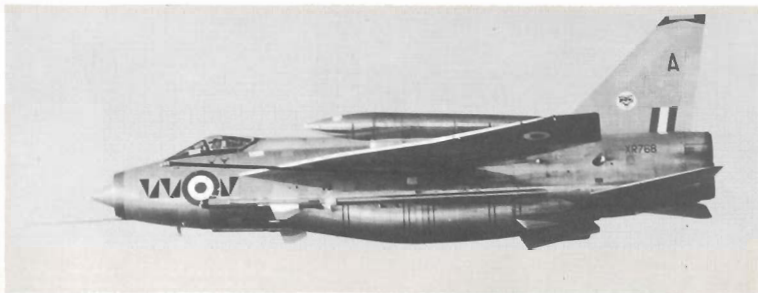
Right: T.4 in black scheme and day-glo bands, 1966 colour side-view D3. (D. M. Verheyeweghen)



Above: T.5 XS416 of No. 74 Squadron, note different presentation of squadron markings and day-glo trainer bands. (Roger Levy)

Below: F3 XP702 of No. 74 Squadron, note presentation of small insignia on fin and Tiger striped refuelling probe. (Roger Levy)





Top: F.6 of No. 74 Squadron landing at Akrotiri, Cyprus in 1971. (RAF/MoD via Air Pictorial)

Above: Flying shot of a F.6 of No. 74 Squadron, note refuelling probe and Red Top missile. (RAF/MoD via J. W. R. Taylor)

Below: One of the first F.2's of No. 92 Squadron to have the all blue spine. Leconfield, July 1964. (Roger Levy)

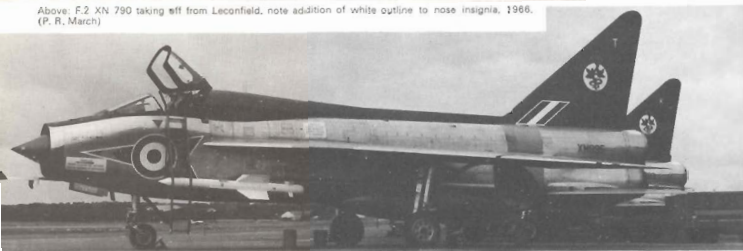




Above: Line-up of F.2's of No. 92 Squadron, XN 728 nearest camera, note loaded armament sign. (Roger Levy)



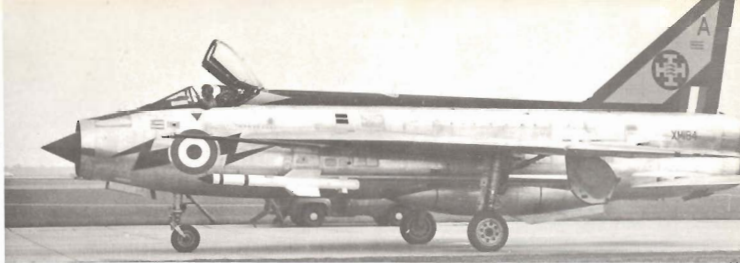
Above: F.2 XN 790 taking off from Leconfield, note addition of white outline to nose insignia, 1966. (P. R. March)



Above: T.4 XM 995 in the blue markings of No. 92 Squadron, note orange day-glo trainer bands, 1966. (S. P. Peltz)



Below: F.1A XM 192 of No. 111 Squadron at Middleton St. George in September 1961. (Roger Levy)



Above: F.1A of No. 111 Squadron, XM 184 the O.C.'s aircraft awaiting take-off at Alconbury, May 1964. See side-view illustration E2. (Roger Levy)

Right: F.1 XM 140 consigned to the breakers yard, No. 111 Squadron used few F.1's pending arrival of F.3's, Lyneham, October 1966. (Brian Pickering via Roger Levy)

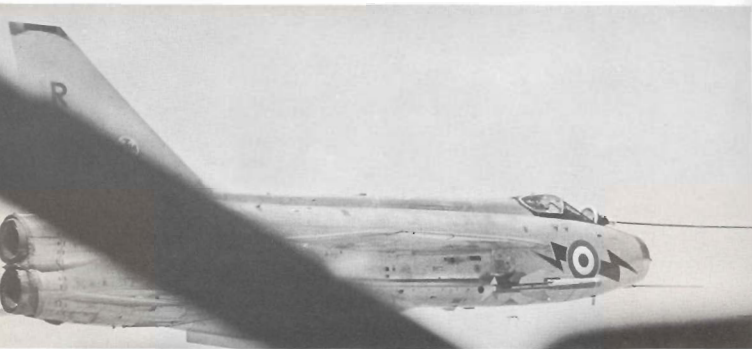


Below: F.3 of No. 111, XR 712 getting the gear up after take-off.



Below: F.3 of No. 111 Squadron in latest markings, note JG 71 insignia on nose, Wattisham, May 1971. (Roger Levy)





Sequence of shots of F.3's of No. 111 Squadron refuelling from a Victor K.1 tanker XA 928 of No. 57 Squadron at 30,000 feet over the North Sea. May 1971. (Photos Roger Levy)





Above: F.1 XM 137 of the Air Fighting Development Squadron, AFDS, at Waddington, September 1961. (Roger Levy)



Above: T.4 XM 970 of the Lightning Conversion Squadron, Middleton St. George, September 1962. Note yellow trainer bands. (Roger Levy)



Below: F.1 XM 147 of the Wattisham TFF, May 1968.



Above: F.1A XM 192 of the Wattisham TFF, May 1971.



Above & below: F.1's of the Leuchars TFF, 1968.



Below: A Leuchars TFF F.1 photographed in 1966 prior to the adoption of the nose marking illustrated above. (Photos Roger Levy)





Above: F 6 XR 756/U, Command Reserve aircraft serving with the Leuchars Wing touching down at just under 200 mph in typical Leuchars weather.



Above: F.1 XM 143 of No. 145 Squadron/No. 226 Operational Conversion Unit at Middleton St. George in October 1963 resplendent in the scarlet and white markings of No. 226 OCU.



T.4 XM 990 above and T.5 XS 418 in the markings of No. 145 Squadron/No. 226 OCU, both aircraft with orange day-glo trainer bands. Coltishall 1964 and 1965. (Photos Roger Levy)





Above: F.1A XM 182 in the markings of No. 65 Squadron/No. 226 OCU, Upper Heyford, June 1971. (Brian Lowe)



Above: T.4 XM 970 of No. 65 Squadron/No. 226 OCU, Upper Heyford, June 1971. Note the trainer bands have been removed. (Photo Brian Lowe)



Below: T.5 XS 452 of No. 145 Squadron/No. 226 OCU, Lakenheath, June 1970. Note the four yellow Fire-streaks on fin. (Photos Roger Levy)

Natural Metal

Polished
Stainless Steel

Pale to medium
Greenish Grey

Red

Black

Blue

E2
Radar surfaces.
Typical of all
production aircraft.

C2
Upper surfaces.
Particular to
Nos. 10 Squadron.

A4
Upper surfaces.
Particular to
Nos. 23 Squadron.

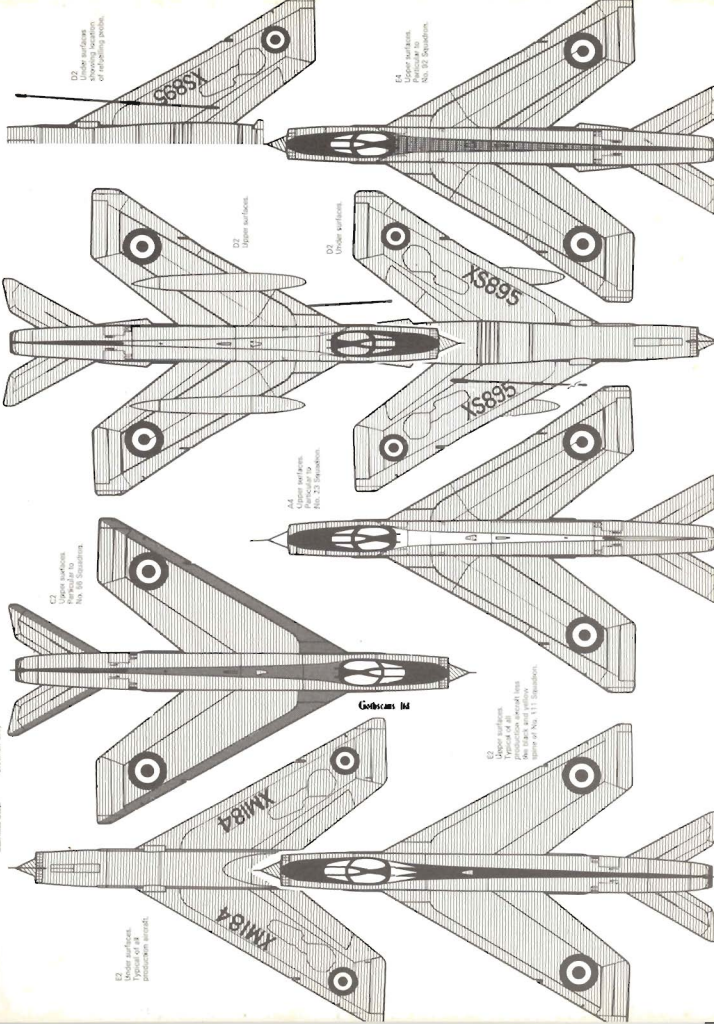
D2
Upper surfaces.

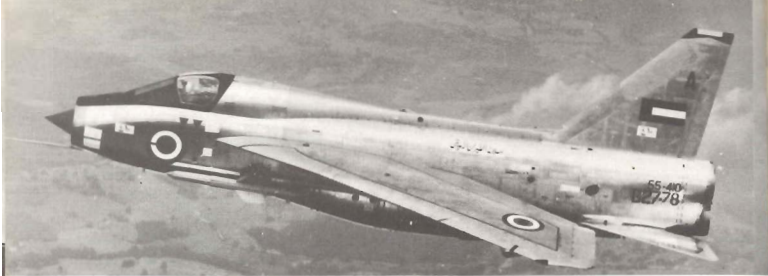
D3
Under surfaces.

E4
Upper surfaces.
Particular to
Nos. 94 Squadron.

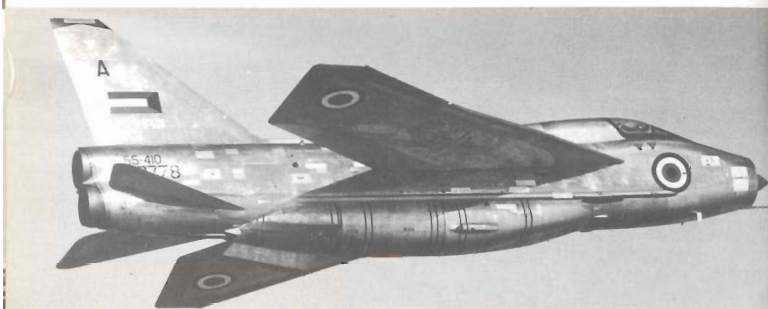
G2
Upper surfaces.
Typical of all
production aircraft less
Nos. 10 and 23 Squadrons.

Gothic 14





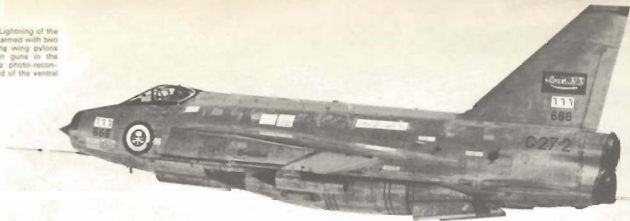
Above & below: Port and starboard views of a Kuwait Air Force Mark 55 trainer equipped to carry Firestreak missiles for interception duties. (BAC)



Below: A Mark 55 trainer of the Royal Saudi Air Force. (BAC)



A Mark 53 Multi-role Lightning of the Royal Saudi Air Force armed with two Matra launchers on the wing pylons and two 20mm Aden guns in the ventral position. Note photo-reconnaissance pack forward of the ventral cannon. (SAC)



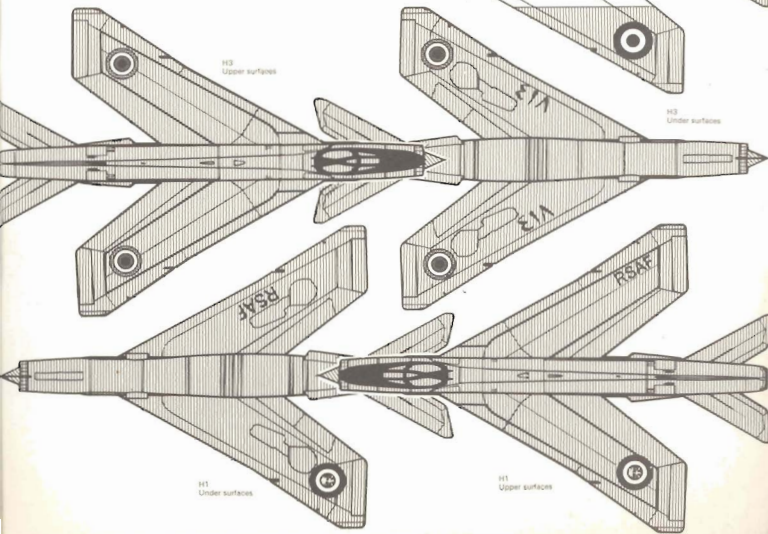
KUWAIT



SAUDI ARABIA

P2
Upper surfaces,
typical of T4 and T5 Lightnings
with either yellow or orange day-glo
trainer bands, plan view particular
to XS 418 No. 226 OCU.

Orange day-glo trainer bands shown white.



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Netherlands East Indies Air Force
West German Luftwaffe

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Front cover, top to bottom:

- FC1 Lightning F.1A, No. 111 Squadron, 1961.
FC2 Lightning F.6, No. 23 Squadron, one of two aircraft sent to the Toronto Air Show, August/September 1968.
FC3 Lightning T.5, No. 56 Squadron showing the latest markings on nose and fin.